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Telenomus dilatus sp. n. (Hymenoptera: Platygastridae) - an egg parasitoid of swallowtail butterflies from South India

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Abstract

Telenomus dilatus (Hymenoptera: Platygastridae), an egg parasitoid of swallow tail butterflies is described as new to science. The species has been reared on several occasions in the South Indian State of Kerala, from the eggs of three species of swallow tail butterflies-Troides minos, Pachliopta pandiyana and Pachliopta aristolochiae. T. dilatus sp. n. can be easily distinguished by its basal male antennal segments- A1, A4 and A5, which are extremely dilated. Digital images of the new species are provided and its affinities with closely resembling species are discussed.

Keywords: Telenomus, India, swallowtail butterflies, egg parasitoid, new species.

Introduction

Telenomus Haliday of subfamily Telenominae (Hymenoptera : Platygastridae) is a large cosmopolitan genus of egg parasitoids (Johnson, 1984). The hosts are mostly Lepidoptera and Hemiptera, but they are also known to attack Dipteran and Neuropteran eggs (Johnson, 1984; Johnson and Bin, 1982). With more than 612 described species, this is the largest genus under Platygastridae (Austin et al. 2002). Altogether 22 species of Telenomus are known from India (Rajmohana, 2006, Rajmohana et al. 2013a, 2013b). Though economically significant as biocontrol agents, the systematics of this genus is largely ignored (Johnson, 1984).

The present study describes a new species of Telenomus reared from the eggs of three species of papilionid butterflies, which include, the Indian peninsular endemic, Troides minos (the Southern Birdwing), the south Indian endemic Pachiolopta pandiyana (the Malabar Rose) and also Pachiolopta aristolochiae (the Common Rose), which enjoys a wide distribution in South and South east Asia. The new species described here has been reared on several occasions in the South Indian state of Kerala**.** T. dilatus sp. n. can be easily distinguished by its basal male antennal segments, A1, A4 and A5, which are extremely dilated. Earlier Krishnamoorthy and Singh (1986, 1988) and Veenakumari and Prasanth 1984, Jalali and Singh, 1990 had reported Telenomus species from the eggs of swallowtail butterflies in India.

Materials and methods

This work is a part of the ongoing studies on the systematics of Telenominae in South India. Morphological terminology is after Johnson (1984), Miko et al. 2007 and male genitalia studies follow Polaszek and Kimani (1990). The holotype comparisons of T. stigis Nixon are from the excerpts of the studies (Unpublished) on Nixon's type specimens of Indian Telenominae made by the first author, in 2007, during a study visit to BMNH, London.

Description and light microscopy imaging were done with the help of Leica M205A stereomicroscope and Leica DFC-500 digital camera and images processed using LAS montage. The SEM images were procured with

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Jeol JCM-5000 NeoScope Benchtop SEM, using specimens coated with gold.

All the material studied are deposited in National Zoological Collection, of Zoological Survey of India, Calicut.

Abbreviations and Terminology**:** A1-A11: Antennal segments 1 to 11; T1-T2: Metasomal tergites 1 to 2; L= Length; W= Width; DCI-Dorsal Cephalic Index (ratio of width to length of head measured dorsally; LOL=Lateral ocellar length; POL= Posterior ocellar length

BMNH-Natural History Museum, London; NZC- National Zoological Collection; ZSIC-Zoological Survey of India, Calicut, Kerala.

Systematics

Telenomus dilatus Rajmohana et Anto, sp. n. (Figs. 1-9)

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Material examined**:** Holotype ♀: India: Kerala: Trichur, on 27.vi.2000 (Reg.No. ZSI/INV/4126, reared from eggs of Troides minos. Paratypes 2 ♂ (4127-4128) and 10 ♀ with data same as holotype (4129-4139); 1 ♂ and 1 ♀ (4140 and 4141) emerged on 4.vii.2000 from Pachliopta pandiyana eggs and 2 ♀ (4142-4143) on 1.xii.2010, from eggs of Pachliopta aristolochiae. All specimens reared by Mary Anto from Trichur.

Description

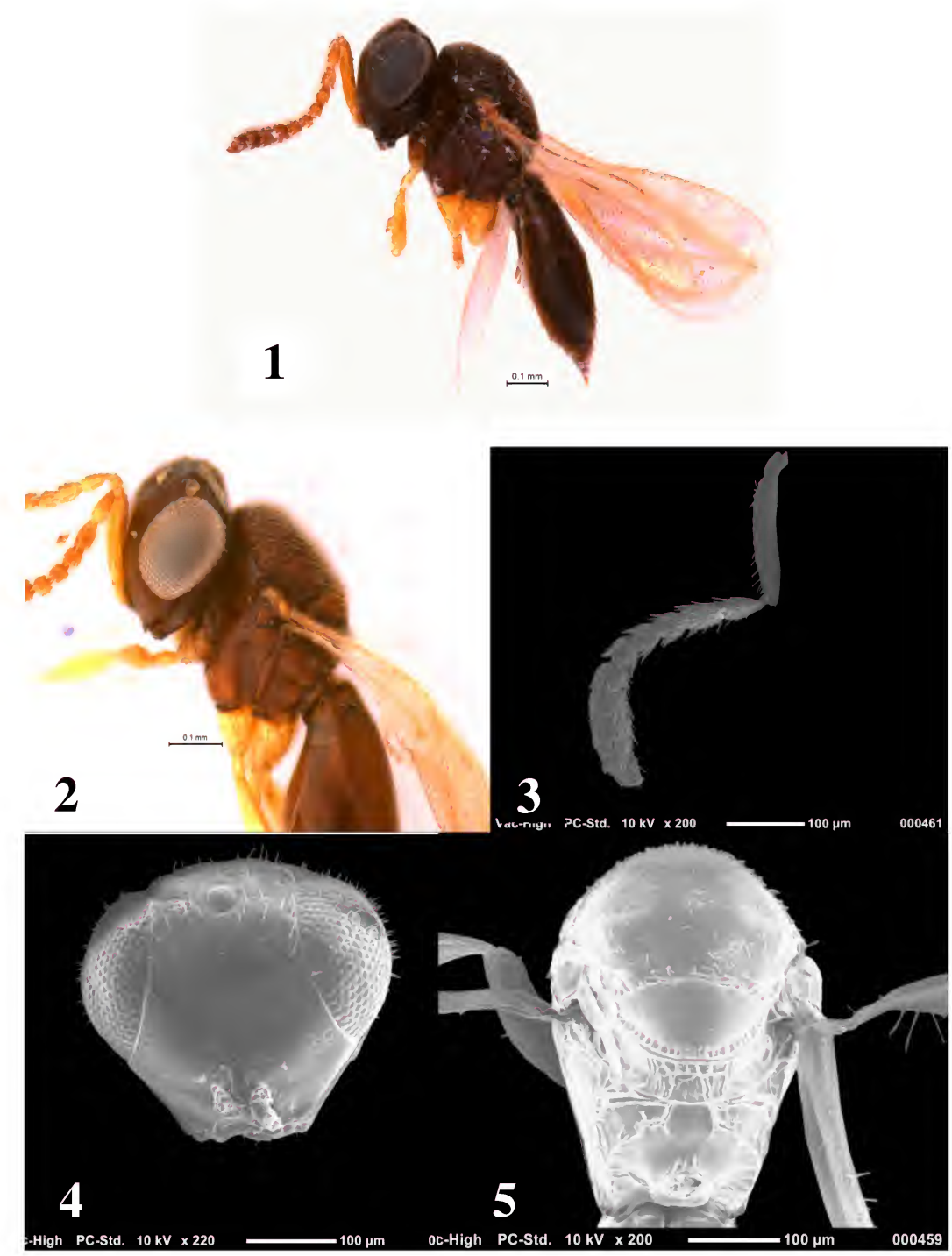
Holotype. Female. Body length =1.01mm. Head and body light to dark brown to black; antennae as well as coxae brownish yellow, fore coxae and claval segments darker; eyes silvery; wings hyaline.

Head: distinctly transverse ; DCI=2.3; vertex and occiput with fine coriaceous reticulate sculpture and with scattered and superimposed setigerous punctures; more coriaceous towards vertex; vertex deeply cut to occiput; hyperoccipital carina seen as a trace; eyes large, densely pilose; occipital carina simple and complete; orbital band wide, not interrupted medially; frons width > eye height(9:8.5); two pairs of ocellar setae distinct; frontal depression weak, frons not bulging between antenna insertions and inner orbit; inner orbits rounded at level of lateral ocelli; LOL: POL= 4.5:10; malar sulcus unusually wide towards orbital corner; temples not bulging laterally; antenna 11 segmented, claval segments 5; A2 2x as long as wide, subequal to A3, A3 length >A4 length (1.2x), A7-A10 transverse.

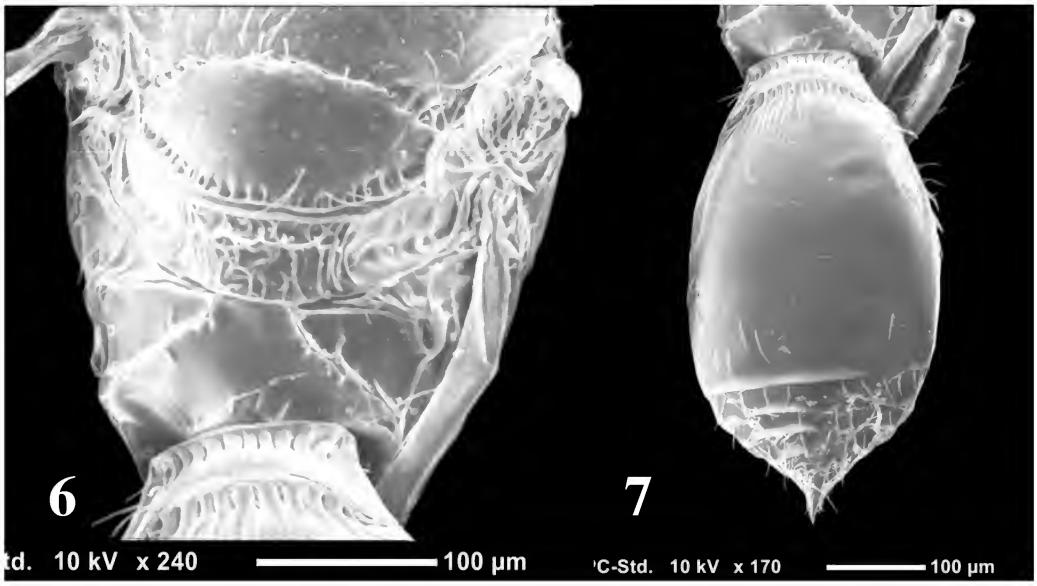
Mesosoma: (L:W =101:95); mesoscutum not as wide as head dorsally (23:26); distinctly convex when viewed laterally, notauli absent; densely setose; sculptured uniformly with rough scaly reticulations; scuto-scutellar sulcus narrow medially, but laterally wide and foveolate; humeral sulcus elongate, not foveolate; mesoscutellum smooth throughout; pubescence not as dense as on mesoscutum; lower margin evenly curved, submarginal foveae smaller than dorsellar punctures; dorsellum longest medially and overlapping propodeum; coarsely reticulate anteriorly, but distally with irregular longitudinal rugosities; acetabular field almost bare; episternal fovea absent; intercoxal space slightly exceeding length of forecoxa; netrion smooth; mesopleural furrow distinct, but mesopleural carina absent; metapleuron bare and smooth medially, except for fine traces of a few crenulae; metapleural carina indicated as a short spur posteriorly; forewing at rest surpassing apex of metasoma; hindwing at its widest point as long as length of marginal fringe; forewing L:W= 26:9; post marginal vein much longer than stigmal vein.

Metasoma: (L:W= 10.2:5.6), slightly less than 2x as long as wide; very slightly longer than combined length of head and mesosoma; T1 with longitudinal striae extending nearly to its three-fourth; 2 pairs of sublateral setae distinct; greatest length of basal costae on T2 along with fine longitudinal wrinkles, 2x median length of T1, extending nearly to dorsal one-fourth.

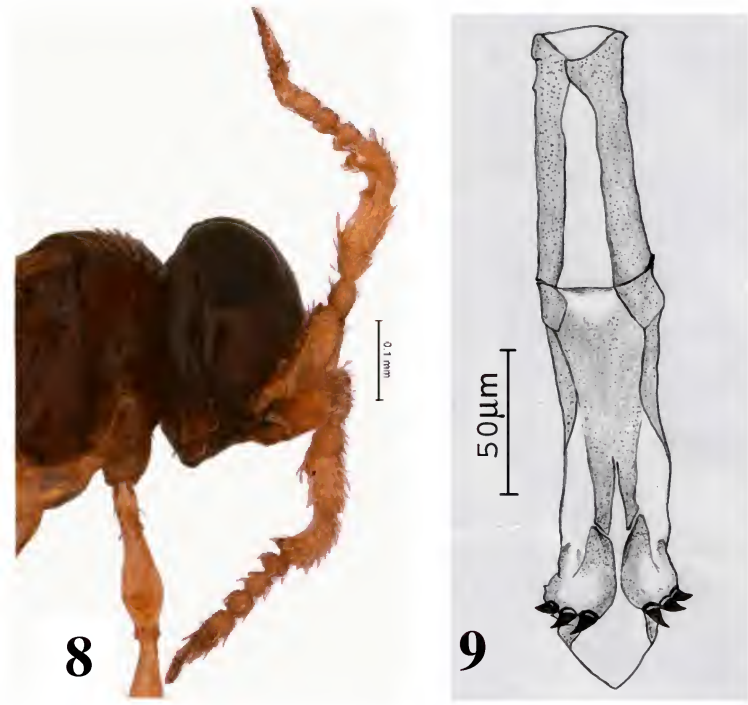
Male: Length 1.03mm. Resembles female, except in aspects mentioned below. Antenna with 12 segments, A1 unusually dilated, wide medially; A4 and A5, subequal, extremely dilated or enlarged, A4 slightly and A5 distinctly curved medially, A6 to A11 more or less globular, A9-A10 transverse; A12 elongate, 1.1x longer than A10 and A11



Figs.1-7: Telenomus dilatus sp. n. (Female) 1.Body Profile; 2. Mesosoma profile; 3. Antenna; 4. Head frontal view; 5. Mesoscutum dorsal view.



Figs.6-7: Telenomus dilatus sp. n. (Female) 6. Mesoscutellum and dorsellum; 7. Metasoma.



Figs.8-7: Telenomus dilatus sp. n. (Male) 8. Antennae; 9. Genitalia.

combined. Male metasoma (L:W= 85:57), widest towards lower T2.

Male genitalia: Resembling much that of T. talus Nixon and T. stigis Nixon as per the medially drawn, tapered and truncate towards tip, one third the length of aedeago volsellar shaft; laminae volsellares sclerotized; digiti large, nearly 0.5x maximum length of aedeagal lobe, with 3 teeth per digitus; central projection absent.

Host: Eggs of swallowtail butterflies- Troides minos, Pachliopta pandiyana and Pachliopta aristolochiae.

Etymology: The species is named 'dilatus' after the dilated appearance of the basal male antennal segments.

Discussion

T. dilatus sp. n. belong to Telenomus californicus species complex, as per Johnson, 1984. Though the females of T. dilatus do not possess any prominent or peculiar distinguishing features, the male antenna with its enlarged A1, A4 and A5 serve as a strong diagnostic character to the species. In addition, the following combination of characters: 11-segmented antenna in females and 12 segmented in males, uniformly reticulate mesoscutum, smooth scutellum, anteriorly reticulate dorsellum, and with irregular longitudinal rugosities distally, T1 with two pairs of sublateral setae, striae on T2 extending nearly to its one-fourth anterodorsally and male genitalia with three teeth on digiti, can distinguish the species.

Nixon 1937 described Telenomus talaus from the eggs of a swallowtail butterfly Papilio agamemnon, collected from Malaysia. The male antenna of this species however do not possess any dilations or enlargements, as met with in T.dilatus sp. n. Nixon 1937 also commented that T. talus was very much similar to T. stigis Nixon, a species reared from the eggs of a moth, Acherontia stynx at Kuala Lumpur (Malaysia) in which A4 and A5 of the male antenna were largely dilated and modified. No other species of Telenomus in Oriental regional is reported to have such a peculiarity. A5 in the males of T. dilatus sp. n. is unique, with a characteristic median curve (A5 in T. stigis is not curved medially), A4 and A5 elongate, almost subequal in length, more than 2x length of A3 in T. dilatus sp. n. (A5 is nearly 1.5x as long as A4 in T. stigis, and A4 is only very slightly longer than A3 in T. stigis). Female antenna is 11 segmented in T. dilatus (in both T. talaus and T. stigis female antenna are 10 segmented only).

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